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XX. *An Account of Three Volcanos in the Moon.* By William Herschel, LL.D. F.R.S.; communicated by Sir Joseph Banks, Bart. P. R. S.

Read April 26, 1787.

IT will be necessary to say a few words by way of introduction to the account I have to give of some appearances upon the moon, which I perceived the 19th and 20th of this month. The phænomena of nature, especially those that fall under the inspection of the astronomer, are to be viewed, not only with the usual attention to facts as they occur, but with the eye of reason and experience. In this we are however not allowed to depart from plain appearances; though their origin and signification should be indicated by the most characterising features. Thus, when we see, on the surface of the moon, a great number of elevations, from half a mile to a mile and an half in height, we are strictly intitled to call them mountains; but, when we attend to their particular shape, in which many of them resemble the craters of our volcanos, and thence argue, that they owe their origin to the same cause which has modelled many of these, we may be said to see by analogy, or with the eye of reason. Now, in this latter case, though it may be convenient, in speaking of phænomena, to use expressions that can only be justified by reasoning upon the facts themselves, it will certainly be the safest way not to neglect a full description of them, that it may appear to others

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how far we have been authorized to use the mental eye. This being premised, I may safely proceed to give my observations.

April 19, 1787, 10 h. 36' sidereal time.

I perceive three volcanos in different places of the dark part of the new moon. Two of them are either already nearly extinct, or otherwise in a state of going to break out; which perhaps may be decided next lunation. The third shews an actual eruption of fire, or luminous matter. I measured the distance of the crater from the northern limb of the moon, and found it $3' 57''$, 3. Its light is much brighter than the nucleus of the comet which M. MÉCHAIN discovered at Paris the 10th of this month.

April 20, 1787, 10 h. 2' sidereal time.

The volcano burns with greater violence than last night. I believe its diameter cannot be less than $3''$, by comparing it with that of the Georgian planet; as Jupiter was near at hand, I turned the telescope to his third satellite, and estimated the diameter of the burning part of the volcano to be equal to at least twice that of the satellite. Hence we may compute that the shining or burning matter must be above three miles in diameter. It is of an irregular round figure, and very sharply defined on the edges. The other two volcanos are much farther towards the center of the moon, and resemble large, pretty faint nebulae, that are gradually much brighter in the middle; but no well defined luminous spot can be discerned in them. These three spots are plainly to be distinguished from the rest of the marks upon the moon; for the reflection of the

sun's rays from the earth is, in its present situation, sufficiently bright, with a ten-feet reflector, to shew the moon's spots, even the darkest of them: nor did I perceive any similar phænomena last lunation, though I then viewed the same places with the same instrument.

The appearance of what I have called the actual fire or eruption of a volcano, exactly resembled a small piece of burning charcoal, when it is covered by a very thin coat of white ashes, which frequently adhere to it when it has been some time ignited; and it had a degree of brightness, about as strong as that with which such a coal would be seen to glow in faint daylight.

All the adjacent parts of the volcanic mountain seemed to be faintly illuminated by the eruption, and were gradually more obscure as they lay at a greater distance from the crater.

This eruption resembled much that which I saw on the 4th of May, in the year 1783; an account of which, with many remarkable particulars relating to volcanic mountains in the moon, I shall take an early opportunity of communicating to this Society. It differed, however, considerably in magnitude and brightness; for the volcano of the year 1783, though much brighter than that which is now burning, was not nearly so large in the dimensions of its eruption: The former seen in the telescope resembled a star of the fourth magnitude as it appears to the natural eye; this, on the contrary, shews a visible disk of luminous matter, very different from the sparkling brightness of star-light.

WILLIAM HERSCHEL.

Slough near Windfor,

April 21, 1787.

P.S. M. MÉCHAIN having favoured me with an account of the discovery of his comet, I looked for it among the Pleiades, supposing its track since the 10th of this month to lie that way; and saw it April 19th, at 10 h. 10' sidereal time, when it preceded FL. *d* Pleiadum about 54'' in time, with nearly the same declination as that star; but no great accuracy was attempted in the determination of its place. As I have mentioned the comet in a foregoing paragraph of this Paper, I thought it proper here to add my observation of it. "The comet is nearly round, with a small tail towards the north following part; the chevelure extends to about four or five minutes; and it has a central, very small, ill-defined nucleus, of no great brightness."

END OF PART I. OF VOL. LXXVII.